

Application of heuristic algorithms in creation of automated games scheduling

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Abstract: When considering battle of teams, Cricket is the most unpredictable game in the world, as the matches requires independent fixation. A fully functional toolkit called *Tourney Scheduler (TS)* helps to organize and administer such purpose in an automated manner. Selection of proper heuristic algorithm to automate scheduling process and optimization is dealt in this paper. *TS* was developed in Visual Studio.NET 2008 using C# language to achieve good user-friendly UI while, data are being maintained in MySQL Server 5.0.

Keywords: Independent fixation, Scheduler, Heuristic algorithm, Tournament administration, User interface (UI).

Introduction

Professional cricket tournament are a major economic activity around the world. Teams do not want to waste their investments in players and structure in consequence of poor schedules of games. Game scheduling is a difficult task with multiple constraints and objectives (e.g. fairness issues).

Since local matches used a manual system to administrate tournaments, that system was studied carefully to get better understanding. Major consideration has been given here to recognize each function in detail manner. All these procedures are presently carried out manually and it is really difficult, error probing, and time consuming. High degree of paper work was involved for these activities. Because of these reason tournament conductors has the necessity to build up a system which will help to overcome this problem and move forward with the help of technology. For this reason software that can automatically produce tournament scheduling with

given requirements and constraints is very important. The goal of this project is to develop a tournament scheduler, *Tourney Scheduler (TS)*.

TS will make it possible to enter data and requirements in a simple way using graphical user interfaces, calculate and propose a schedule, enable manual updates, and finally present the schedule for the selected tournaments. Since different people (Team managers, sponsors, fans, and the media, etc.) will use the software and its user friendliness is crucial. An efficient automatic scheduling is also important, but even more important is a possibility to manually re-schedule or pre-schedule some tournaments. In additionally to keep team scorebook in the meantime of storing and subsequent updates of live-score even with more sophistication via a widget on web.

The *TS* software product via Microsoft Visual Studio 2008 Version 9.0.21022.8 RTM, Microsoft .NET Framework Version 3.5 SP1 was used to implement the system in Microsoft Visual C# language in Windows platform to satisfy the requirements and provide a good user friendly software toolkit. In order to implement data layer MySQL Server 5.0.27-community-nt get involved. MySQL Connector Net 5.0.8.1 is use to make connection between C# and MySQL Server.

Methodology

To create Round Robin scheduling, (Richard, 2011) cyclic algorithm was used.

- Begin with the first round using the standard cyclic algorithm.
- Generate subsequent rounds by rotating the teams $(n/2)-1$ position, rather than just a single position.

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- Stop when $(n-1)$ rounds have been obtained. This gives exactly the same rounds as the cyclic algorithm but in a different order.
- Number the rounds of the modified schedule as $r=1... (n-1)$.

And, Bubble sort algorithm was used to fix league matches (Roseindia.net, 2011), and Greedy algorithms (StackOverflow.com, 2011) was used to venue allocation. That is:

- A collection of grounds, from which a solution created.
- A set of grounds which have already been used.
- A predicate (solution) to test whether a given set of grounds give a solution (not necessarily optimal).

- A predicate (feasible) to test if a set of grounds can be extended to a (not necessarily optimal) solution.
- A selection function (select) which chooses some grounds which has not yet been used.
- An objective function which assign a value to a solution.

Random variables technique used to get randomized team choosing (Dreamincode.net, 2011). Data structure implementation for team search and array data handling (Schildt, 2005).

Results & Discussion

The overall target of this software is to provide better functionality in the administration of cricket tournaments. Venue selection UI helps to assign a selected playground for a match (Fig. 1 & 2).

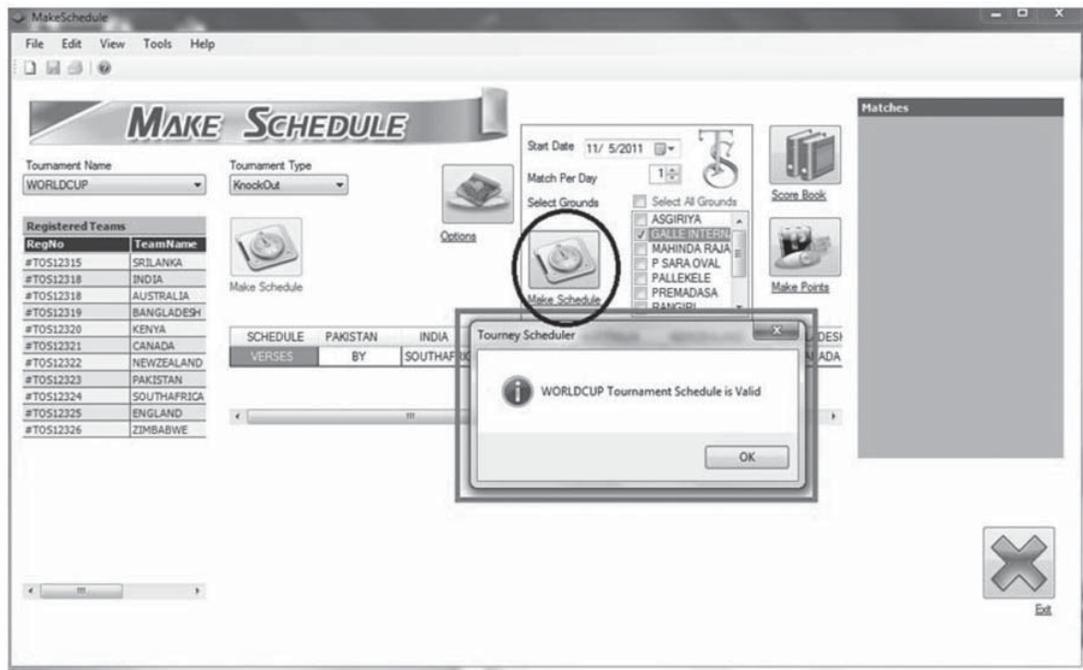


Figure 1: Games scheduling window showing venue selection

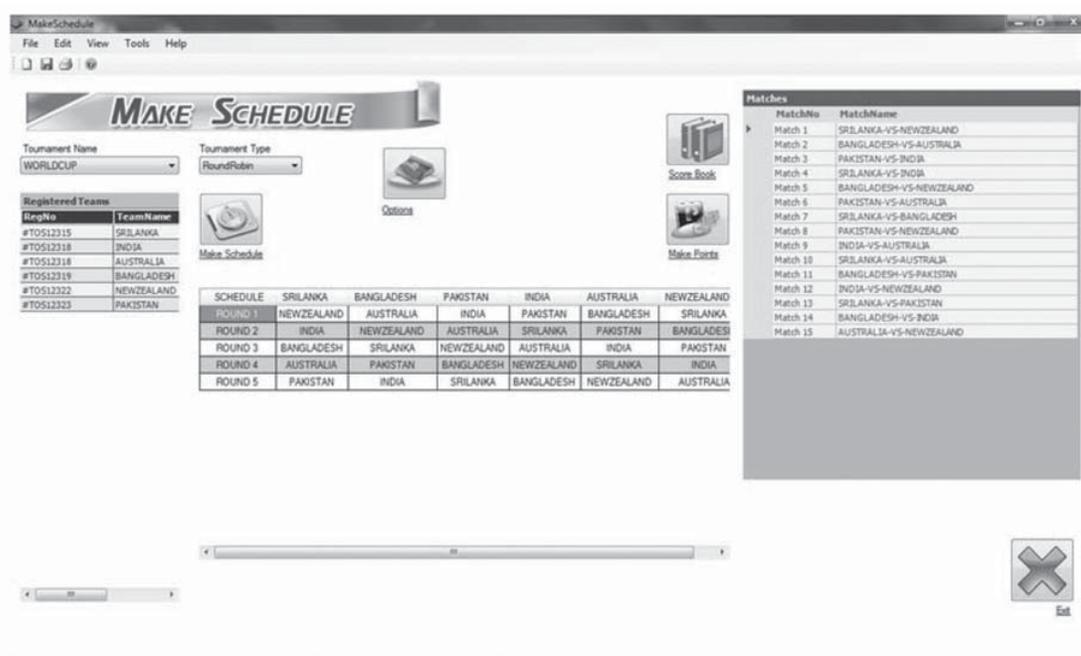


Figure 2: An example of scheduled Cricket tournament using Round Robin method of game

The overall target of this software is to provide better functionality in the administration of cricket tournaments. So, it was decided to get a helping hand from the Information Technology to solve the problems and to provide better working environment. As it was decided and proposed, the objectives of the project have been achieved. The knowledge and experience which I have gained during the project work is vast. It was able to gain better idea of applying theories and techniques in to practical scenarios. Software engineering and project management knowledge and skills were able to brush up in a great deal. More importantly, good experiences were gain in data gathering and requirement analysis activities. In addition, other skills such as communication negotiate with people and planning and scheduling the tasks were practically employed.

Conclusions

This knowhow knowledge was an endeavour to improve and maintain the standards, quality and efficiency of the cricket tournaments and the plenty of rules of cricket is considered on the score book. This work covers all the functionalities of Round Robin and Knock-out cricket tournaments. Tournament pairing, giving points, re-scheduling, ground allocation and players, teams details displaying are some of the highlighted areas of the work done by using heuristic

techniques. Moreover it is possible to produce relevant graphs and reports for team games.

This TS is handled by a single user, especially score book is accessed by a single user at a time. So how to solve this problem might be the next level of this research paper. It is required to go online means, simultaneously, many user have rights to access score card.

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